

REV	Δ	Description	Sheet Effected	Date	Drawn	Checked
A				17.04.05	D.Lanuel	S.Cohen

EMC Laboratory

SA-25G Wired to RF

FCCID: GCD-SA25G Wired to RF Transmitter
 Manufactured by
 Rosslare Ltd.

EMC Test Report

According FCC Part 15 Requirements

Apr 2005

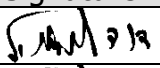
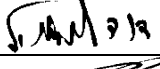

	Function/Title	Name	Signature	Date
Prepared by	Test Engineer	D.Lanuel		17.04.05
Checked by	Test Engineer	D.Lanuel		17.04.05
Approved by	EMC Lab. Manager	S.Cohen		17.04.05

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1 Introduction

a. Scope

This document describes the measurement procedures and tests for FCC part 15 of the SA-25-G Wired to RF Transmitter Manufactured by Rosslare Ltd.

b. Description of equipment Under Test

Equipment Under Test:	SA-25-G Wired to RF Transmitter
FCCID	GCD SA-25G
Manufacturer:	Rosslare Ltd.
Serial Numbers:	3004381
Mode of Operation:	TX MODE
Receiver operating frequency:	433.92MHZ
Year of Manufacture:	2004

c. Applicant Information:

Applicant:	Rosslare Ltd.
Applicant Address	FLAT 12, 9/F WING FAT IND BLDG. 12 WANG TAI RD., KOWLOON BAY. KOWLOON HONG KONG

Telephone:	+972-3-9386838
FAX:	+972-3-9386830
The testing was observed by:	ALEN GREEN
Following applicant's personnel:	

d. Test Performance:

Date of reception for testing:	10.03.04
Dates of testing	11.03.04
	Test Laboratory Location TADIRAN EMC LAB , Hashoftim 26 Holon 58102 ISRAEL Tel: 972-3-5574476 Fax: 972-3-5575320

Applicable EMC Specification:	Federal Communication Commission (FCC), Code of Federal Regulations 47, FCC Docket 89-103,Part 15: Radio Frequency Devices, Sections 15.109, 15.209 & 15.231.
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2 Test Summary and Signatures.

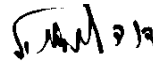
TADIRAN EMC Laboratory has completed testing of E.U.T in accordance with the requirements of the FCC Part 15 Regulations for Class B equipment.

The E.U.T was found to comply with the requirements of the FCC Part 15 Regulations given below

Test	Test Description	Section	PASS/FAIL
1	Bandwidth of the emission	15.231	PASS
2	Field strength of fundamental	15.231	PASS
3	Radiation emission	15.109	PASS
4	Radiation emission	15.231 & 15.205	PASS

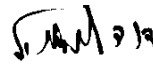
a. **Test performed by:**

Mr. D. Lanuel Test Engineer



b. **Test Report prepared by:**

Mr. D. Lanuel Test Engineer



c. **Test Report Approved by:**

Mr. Samuel Cohen EMC Lab. Manager



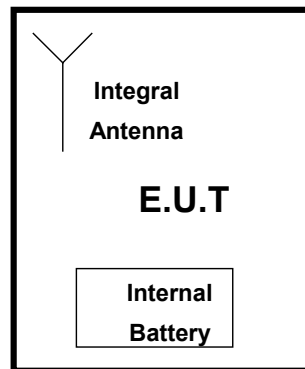
3 E.U.T Information

a. E.U.T description

- 1.1 The SA-25 Wired-to-RF Transmitter is a wall- or ceiling-mounted security device to be used with wired security device Transmitters – providing wireless capability; to be installed in residential and small commercial establishments.
- 1.2 The SA SA-25 Wired-to-RF Transmitter is a stand-alone unit, operating only on internal battery power supply. The unit consists of one (1) PCB, one (1) microcontroller – which controls the Transmitter operation, and a RF transmitter section. The unit does not have a RF receiver section.
- 1.3 The SA-25 Wired-to-RF Transmitter has one RF channel, at 433.92 MHz carrier with OOK modulation.
- 1.4 The SA-25 Wired-to-RF Transmitter active mode transmits identification and status signals in 100ms. A supervisory transmission from the SA-25 to the control panel occurs for the same time of one transmission (100 ms), every 20 minutes per hour.
- 1.5 The battery used is 3vdc lithium, CR123A - replaceable.

b. E.U.T Test Configuration

E.U.T. test configuration is shown in figure bellow



c. E.U.T Mode of Operation description

- (1) 433.92MHz TX Mode operated by battery

4 BANDWIDTH OF THE EMISSION part 15.231—TEST RESULTS

E.U.T: SA-25-G WIRED TO RF TRANSMITTER S/N 3004381
 Test Method: ANSI 63.4
 Date: 11/03/04
 Relative Humidity: 29%
 Ambient Temperature: 21c
 Air Pressure: 1053hpa
 Test Setup: Figure-.1

Testing Engineer: D.Lanuel  **Date** 11/03/04

a. Test Results Summary & Conclusions

The E.U.T was found in compliance with Bandwidth of Radiated Emission fundamental frequency requirement

b. **Limits of bandwidth**

The test unit shall meet the limits of Table 1

Table- 1 Limits For Bandwidth

Frequency (MHz)	Bandwidth Max Limits (%)	Bandwidth Max Limits (KHz)
433.92	0.25	1085

c. **Test Instrumentation and Equipment**

Table- 2 Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
Broadband Antenna	BTA-L	FRANKONIA	10.04.06

d. **Test Results**

Table- 3 Bandwidth Test Result

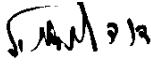
Frequency (MHz)	Bandwidth (KHz)	Bandwidth Max Limit (KHz)	Plot No	PASS/ FAIL
433.92	108	1085	Plot-1	PASS

e. **Procedure**

The Bandwidth is determined at the point 20db down from the modulated carrier, while the spectrum analyzer was set to "max hold" and R.BW –10KHz.

5 field strength of fundamental part 15.231-TEST RESULTS

E.U.T: SA-25-G WIRED TO RF TRANSMITTER S/N 3004381
 Test Method: ANSI 63.4
 Date: 11/03/04
 Relative Humidity: 29%
 Ambient Temperature: 20c
 Air Pressure: 1053hpa
 Test Setup: Figure-1

Testing Engineer: D.Lanuel  **Date** 11/03/04

a. Test Results Summary & Conclusions

The E.U.T was found in compliance with fundamental frequency requirement

b. **Limits** of Field Strength for fundamental according 15.231
 The test unit shall meet the limits of Table 4.

Table- 4 Limits For Fundamental

Frequency (MHz)	Average Max Limits (dBμV/m)	Peak Max Limits (dBμV/m)
433.92	81	101

c. **Test Instrumentation and Equipment**

Table- 5 Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
Broadband Antenna	BTA-L	FRANKONIA	10.04.06

d. Test Results
Table- 6 Average Factor

TX Period(min)	Duty Cycle(min)	Average Factor(db)	Plot Ref
12.3ms	$12.3/100=0.13$	$20\log 0.123=-18.2$	10-12

Table- 7 Peak Result of Fundamental

Frequency (MHz)	Peak Result (dB μ V/m)	peak Limits (dB μ V/m)	Margine d (dB)	Plot No	Pass/ Fail
433.916	90.9	101	10.1	Plot-2	PASS

Table- 8 Average Result of Fundamental

Peak Result (dB μ V/m)	Average Factor	Calculation Results	Average Limits (dB μ V/m)	Margine d (dB)	Pass/ Fail
90.9	-18.2	72.7	81	-8.3	PASS

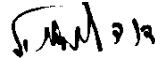
e. Test Procedure

The EUT was placed on the top of rotating table 0.8 meters above the ground and the table was rotated 360°, the height of antenna is varied from one to 4 meters (vertical and horizontal polarization) to determine the max field strength of fundamental

6 Radiated emission part 15.231 & 15.205-test results

E.U.T: SA-25-G WIRED TO RF TRANSMITTER S/N 3004381
 Test Method: ANSI 63.4
 Date: 16/03/04
 Relative Humidity: 29%
 Ambient Temperature: 21c
 Air Pressure: 1053hpa
 Test Setup: Figure 1

Testing Engineer: D.Lanuel



Date 16/03/04

a. Test Results Summary & Conclusions

The E.U.T was found in compliance with 15.231

b. **Limits** of Radiated Interference Field Strength according 15.231

The test unit shall meet the limits of Table 9.

Table- 9 Limits For 15.231(b)

Frequency range(MHz)	Average Limits (dB μ V/m)	peak Limits (dB μ V/m)
0.009 – 3500	61	81

c. **Test Instrumentation and Equipment**

Table- 10 Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
Rode Antenna(10KHz-30MHz)	95010-1	ETN	13.11.05
Double Ridge Guide Antenna(1-18GHz)	3105	EMCO	24.04.05
Broadband Antenna	BTA-L	FRANKONIA	10.04.05
Low Noise Amplifier (0-1GHz)	AM-1300-N	MITEQ	14.01.05
Low Noise Amplifier (1-2GHz)	SMC-09	MITEQ	14.01.05
Low Noise Amplifier (2-6GHz)	SMC-09	MITEQ	14.01.05

d. Preliminary Test Results
Table- 11 Preliminary Test Results for intentional Emissions in TX Mode 15.231

Antenna Polarization	Freq. Range MHz	Res. BW (kHz)	Plot No.	PASS/FAIL
Both Hor.& Ver	0.009 – 0.15	0.2	Plot-3	Pass
	0.15 - 30	9	Plot-4	Pass
	30-1000	120	Plot-5	Pass
	1000-2.000	1000	Plot-6	Pass
	2000-2.800	1000	Plot-7	Pass
	2.800-5000	1000	Plot-8	Pass

e. Final Results
Table- 12 Six Highest Peak Emission Test Results

Mode Of Operation	Freq. (MHz)	peak Reading (*) (dB μ V/m)	Limit dB μ V/m	Margin (dB)	Pass/Fail
TX	1301.769	60.5	74*	13.5	PASS

***Restricted bands**

Table- 13 Six Highest Average Emission Test Results

Mode Of Operation	Freq. (MHz)	Calculated (dB μ V/m)	Limit dB μ V/m	Margin (dB)	Pass/Fail
TX	1301.769	42.3	54	11.7	PASS

f. Test Procedure**(1) Preliminary Test Procedure**

- a) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a chamber shielded
- b) The E.U.T was set 3 meters away from the receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c) The Antenna height varied from one meter above the ground over its full-allowed range of travel and the table was rotated 360° to determine the maximum value of the field strength
- d) The antenna was set both horizontal and vertical polarization.

(2) Final Test Procedure

- a) The EUT was tested at open area for each suspected emission
- b) The test procedure was performed according paragraph f(1) and figure 1

g. Final Test Setup

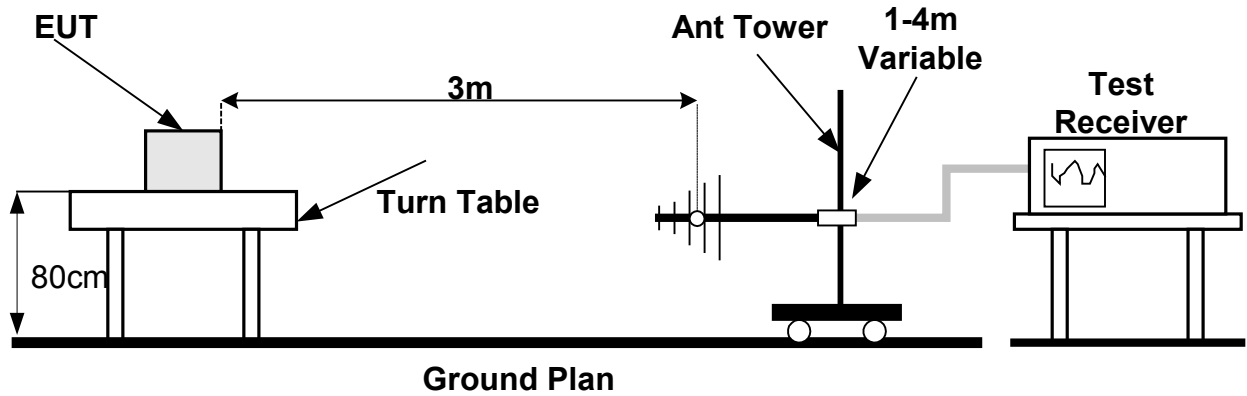


Figure 1 Radiated Emission Set up

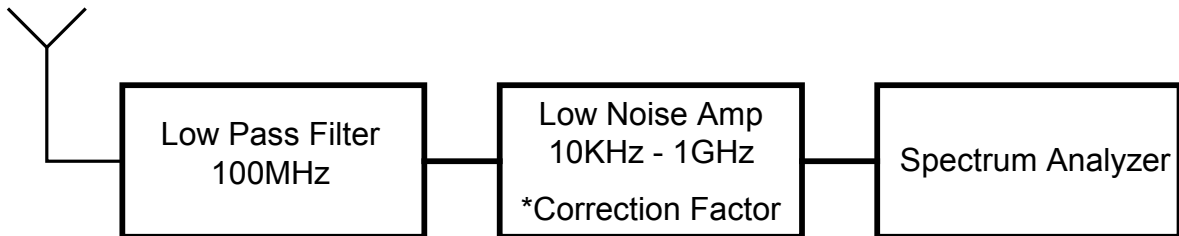


Figure 2 Radiated Emission test 10KHz – 30MHz

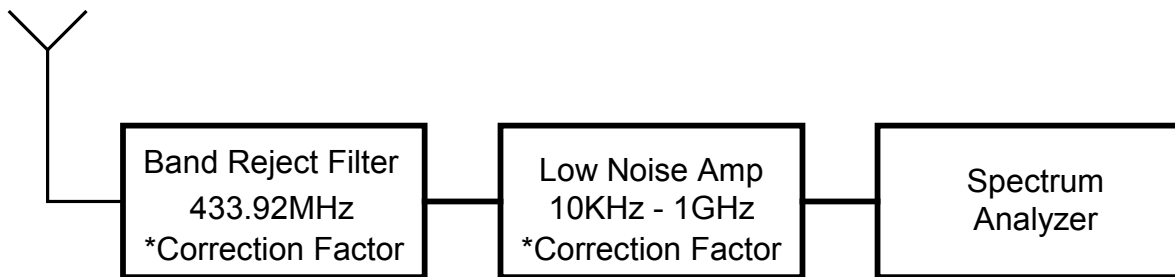


Figure 3 Radiated Emission test 30MHz – 1GHz

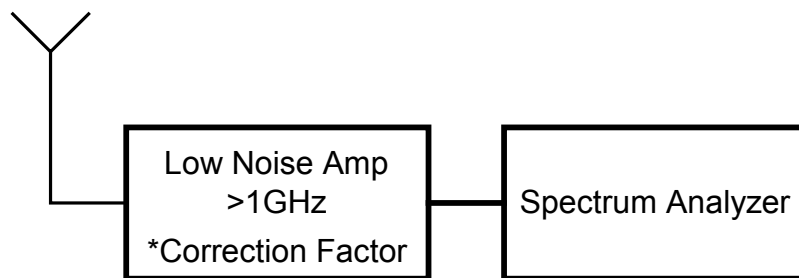
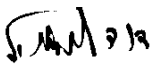


Figure 4 Radiated Emission test above 1GHz

7 Radiated emission part 15.109-test results.

a. Preliminary Radiated emission Test Result According Part 15.109

E.U.T: SA-25-G WIRED TO RF TRANSMITTER S/N 3004381
 Test Method: ANSI 63.4
 Date: 12/03/04
 Relative Humidity: 29%
 Ambient Temperature: 21c
 Air Pressure: 1053hpa
 Test Setup: Figure 1

Testing Engineer: D.Lanuel  **Date** 12/03/04

b. Test Results Summary & Conclusions

The E.U.T was found in compliance with 15.109

c. Limits of Radiated Interference Field Strength according 15.109

The test unit shall meet the limits of Table 14 for Class B equipment.

Table- 14 Limits For 15.109 Class B equipment

Frequency Range (MHz)	Quasi-peak Limits (dB μ V/m)
30 - 88	40
88 - 216	43
216 - 960	46
960 - 2000	54

d. Test Instrumentation and Equipment
Table- 15 Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
Double Ridge Guide Antenna(1-18GHz)	3105	EMCO	24.04.05
Broadband Antenna(30-1000MHz)	BTA-L	FRANKONIA	10.04.05
Low Noise Amplifier (0-1GHz)	AM-1300-N	MITEQ	14.01.05
Low Noise Amplifier (1-2GHz)	SMC-09	MITEQ	14.01.05
Low Noise Amplifier (2-6GHz)	SMC-09	MITEQ	14.01.05

e. Preliminary Results
Table- 16 Preliminary Test Results for Unintentional Emissions in RX Mode 15.109

Configuration	Antenna Polarization	Freq. Range MHz	Res. BW (kHz)	Plot No.	PASS/F AIL
TX	Both	30-1000	120	Plot-9	Pass
		1000-2.800	120	-	Pass
		2000-50000	2000	-	Pass

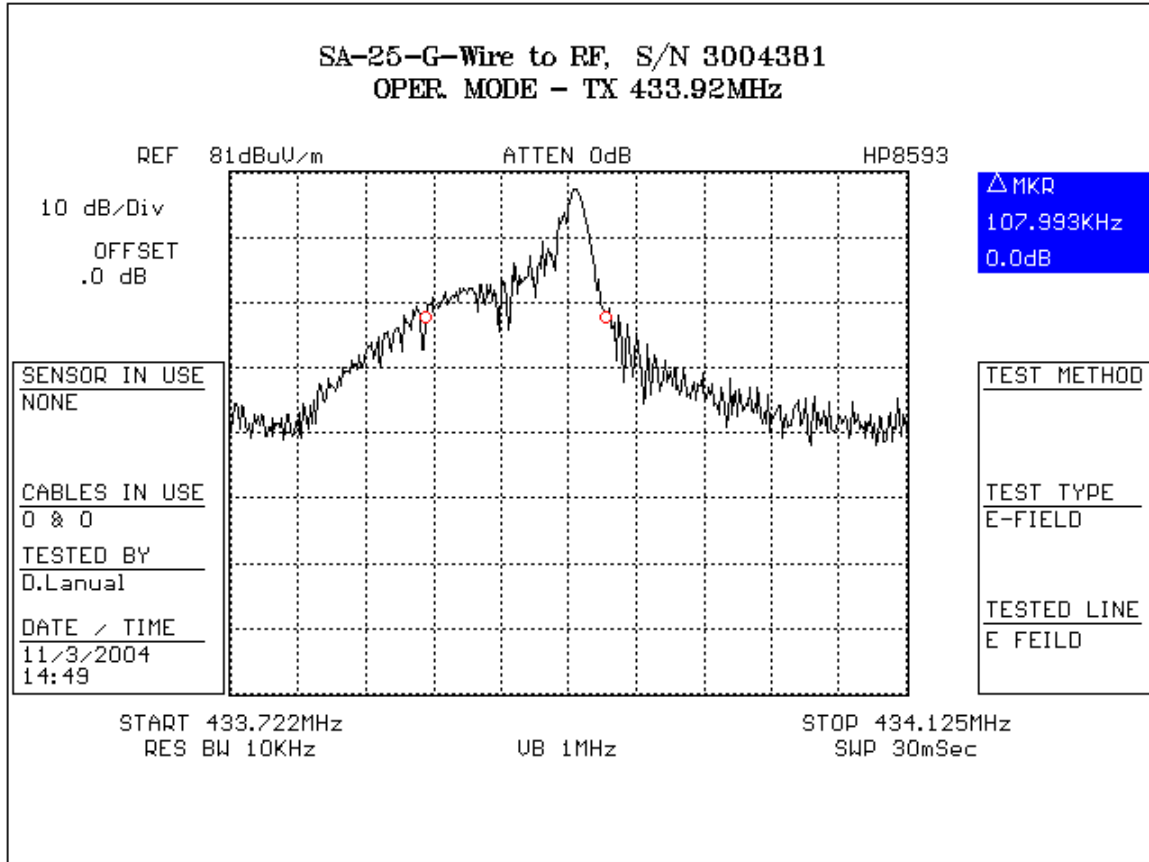
f. Final Test Results
Table- 17 Six Highest RX Mode 15.109

Operational Mode	Freq. (MHz)	peak Reading (*) (dB μ V/m)	Limit dB μ V/m	Margin (dB)	Polarity Ver/Hor	Height (m)
TX	30-1000	The Emissions are at least 20db below the unintentional limits				
	1000-5000	No Emission-Background noise only				

g. Test Procedure

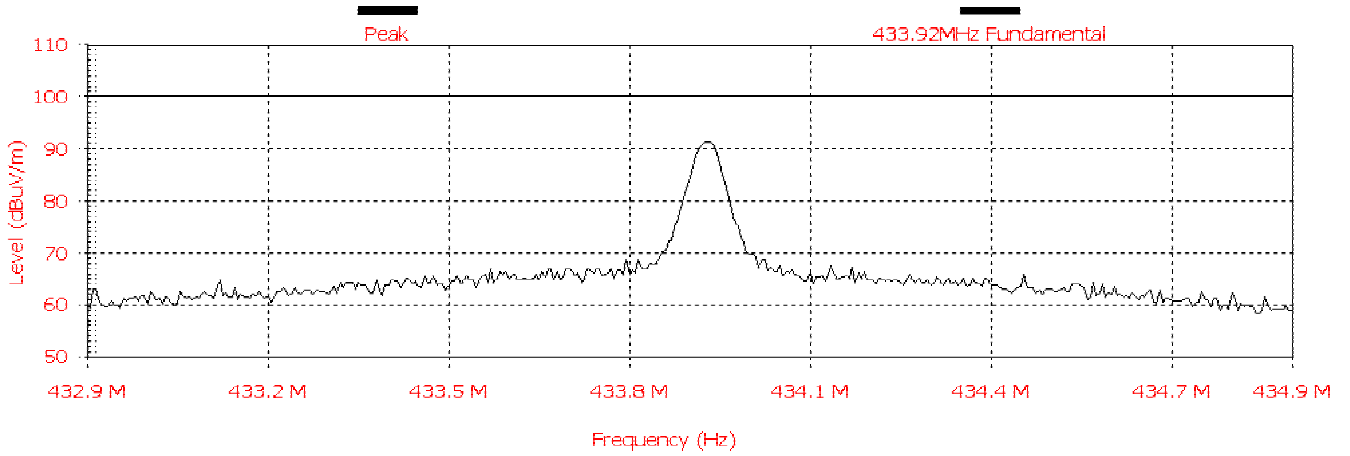
See paragraph 7.f

8 plots

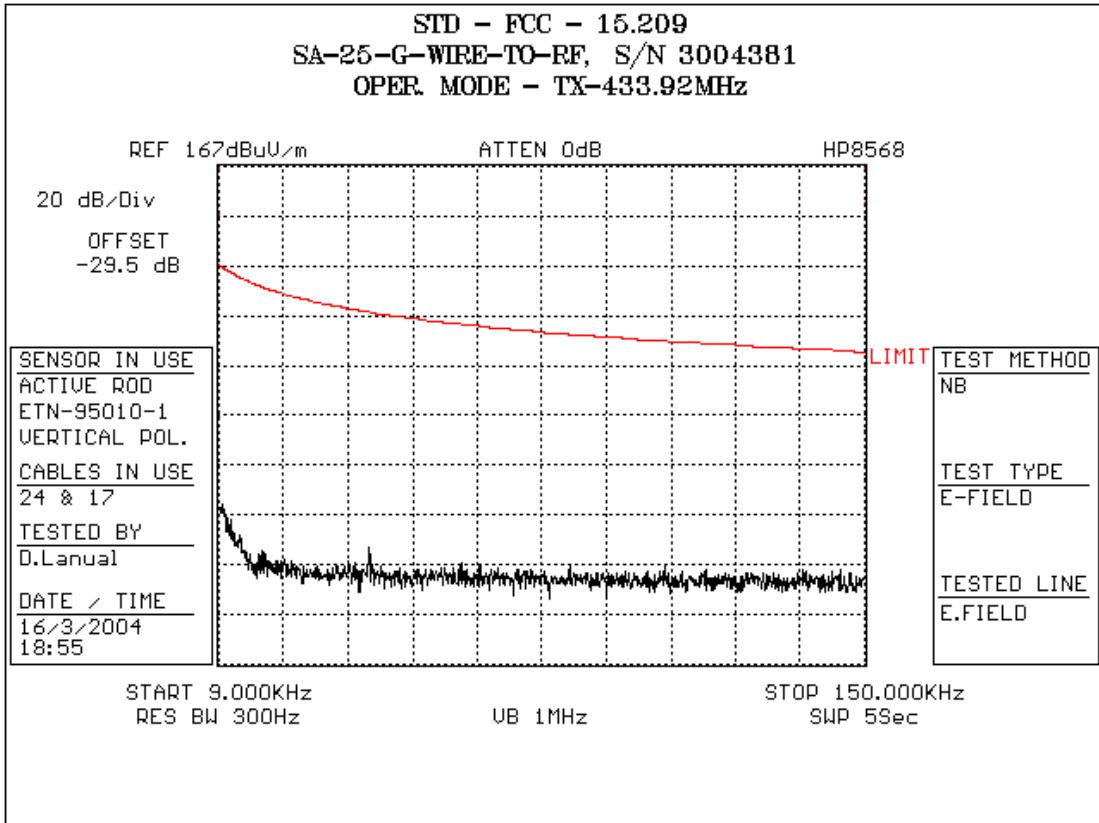


Plot 1 Bandwidth

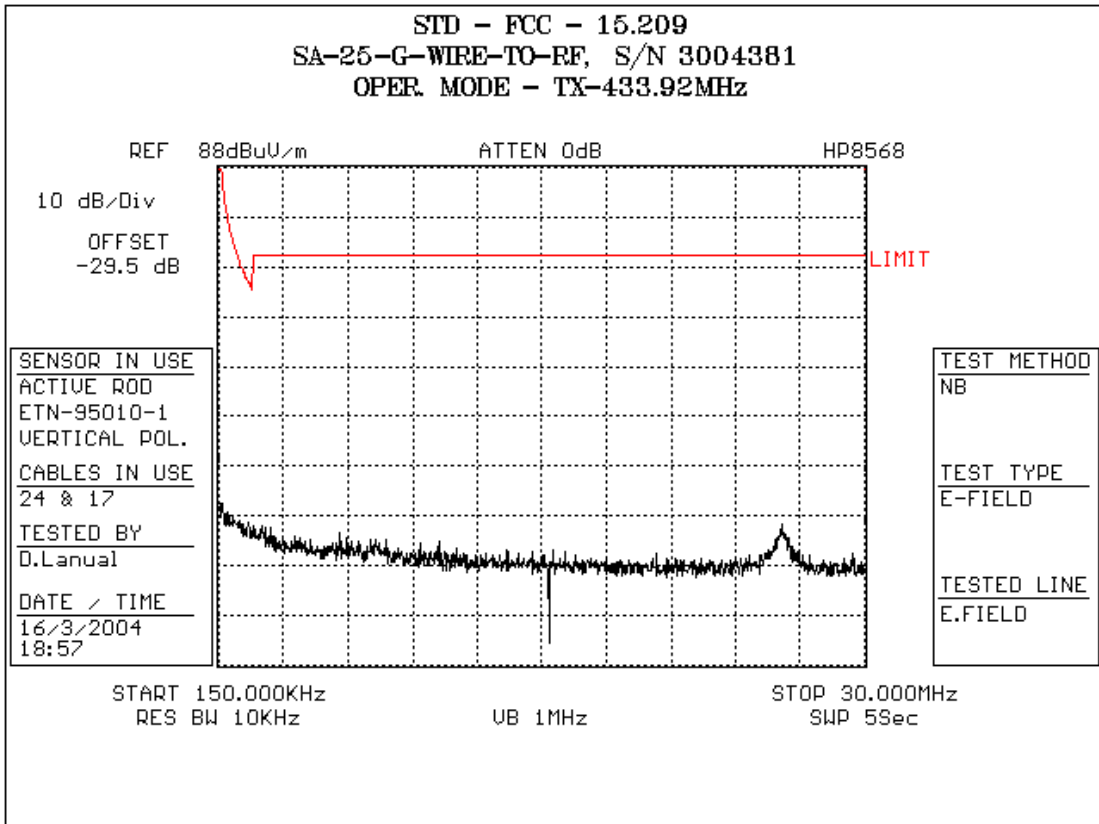
Frequency (MHz)	Pk
433.923	90.9



Plot 2 Field strength of fundamental



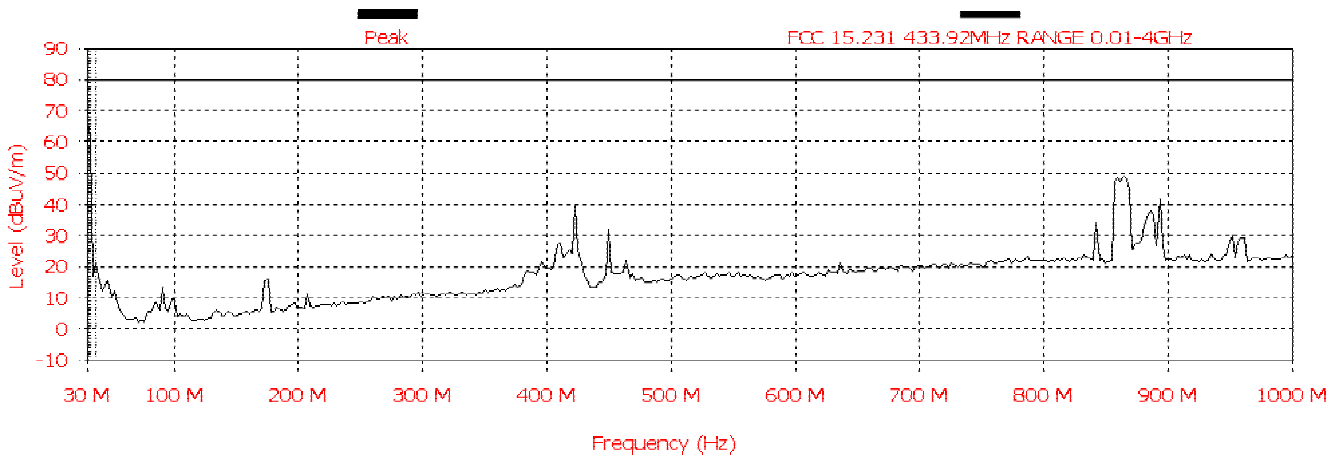
Plot 3 15.231 Radiated Emission



Plot 4 15.231 Radiated Emission

Frequency (MHz)	QP
862.50	49.2

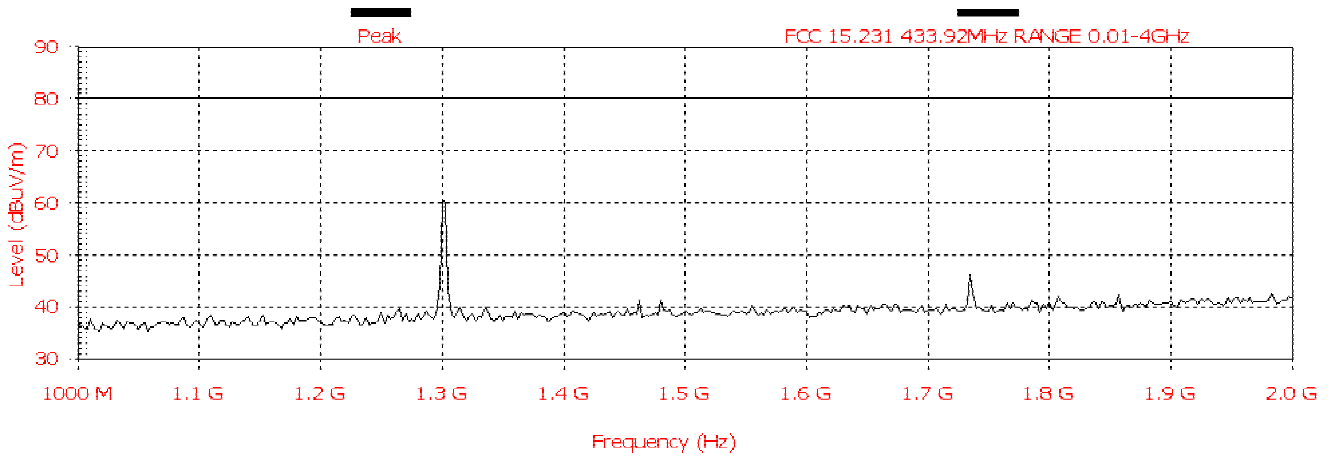
Analyzer setting: R.BW-120K, V.BW-1MHz, QP Transmitter



Plot 5 -15.231 Radiated Emission

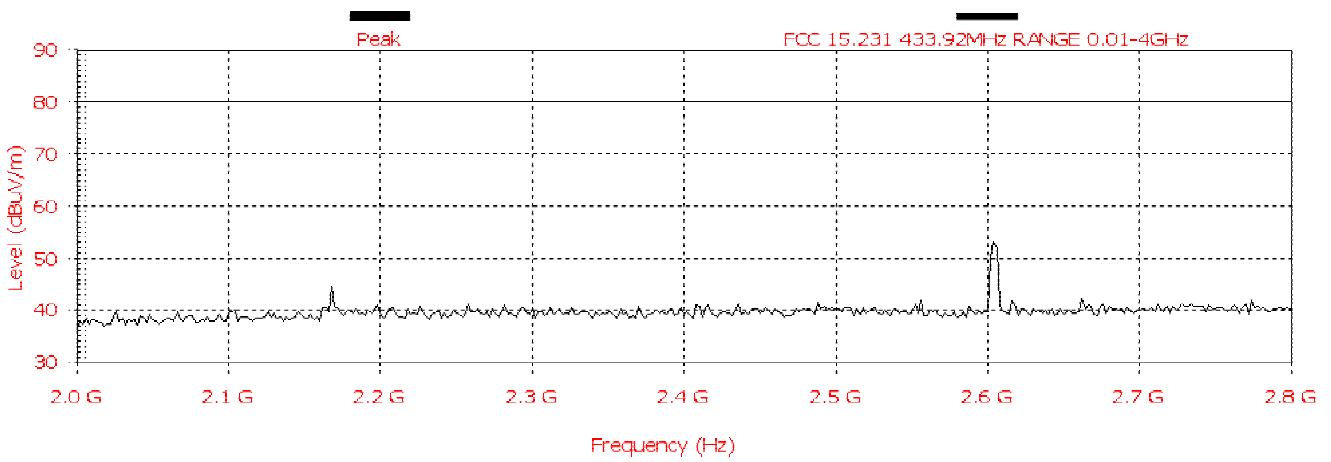
Frequency (MHz)	QP
1301.769	60.5

Analyzer setting: R.BW-1M, V.BW-3MHz, peak Transmitter



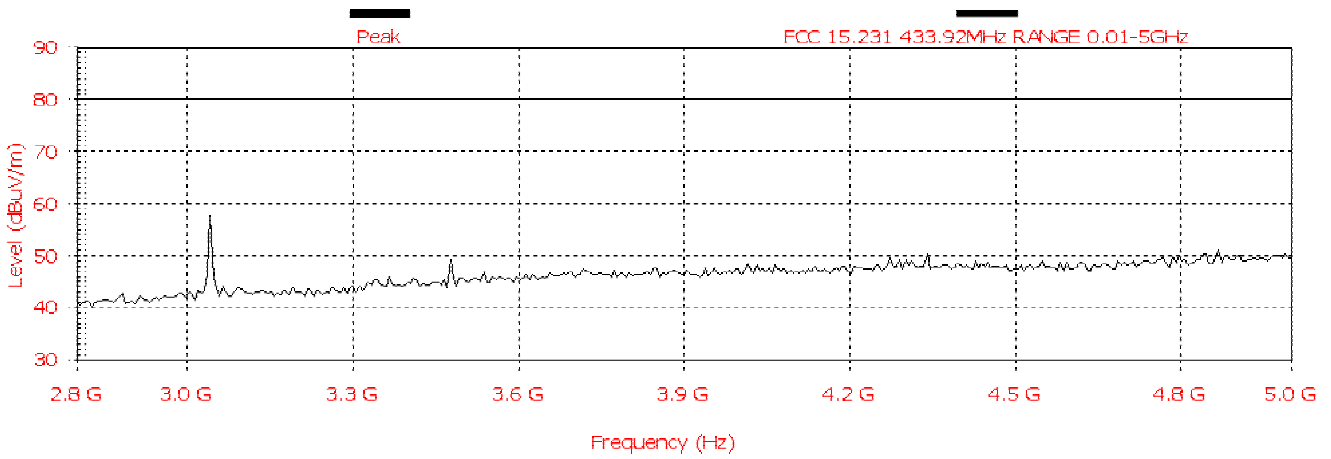
Plot 6 -15.231 Radiated Emission

Analyzer setting: R.BW-1M, V.BW-3MHz, peak Transmitter



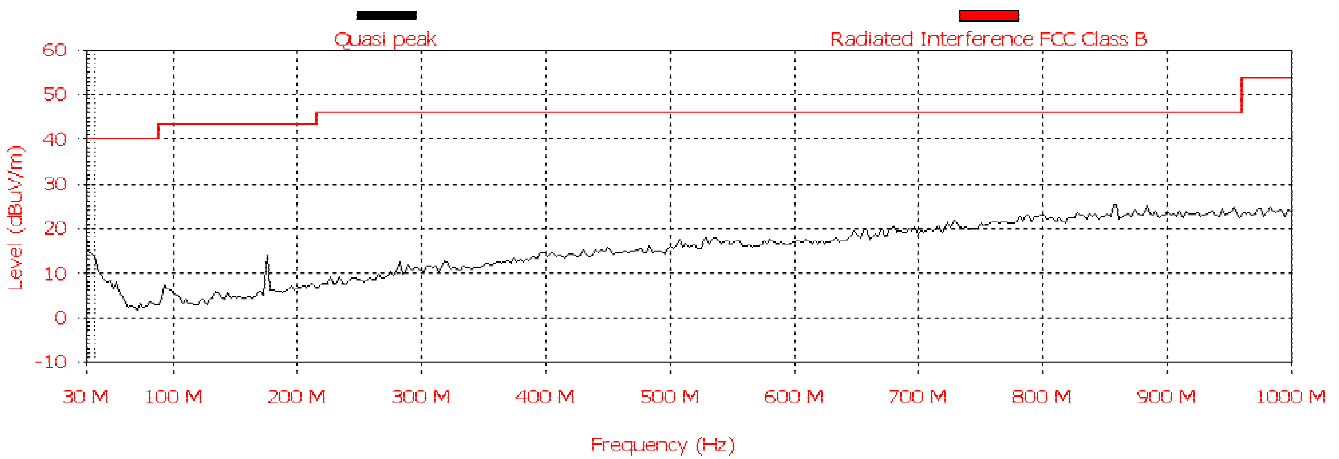
Plot 7 -15.231 Radiated Emission

Analyzer setting: R.BW-1M, V.BW-3MHz, peak Transmitter

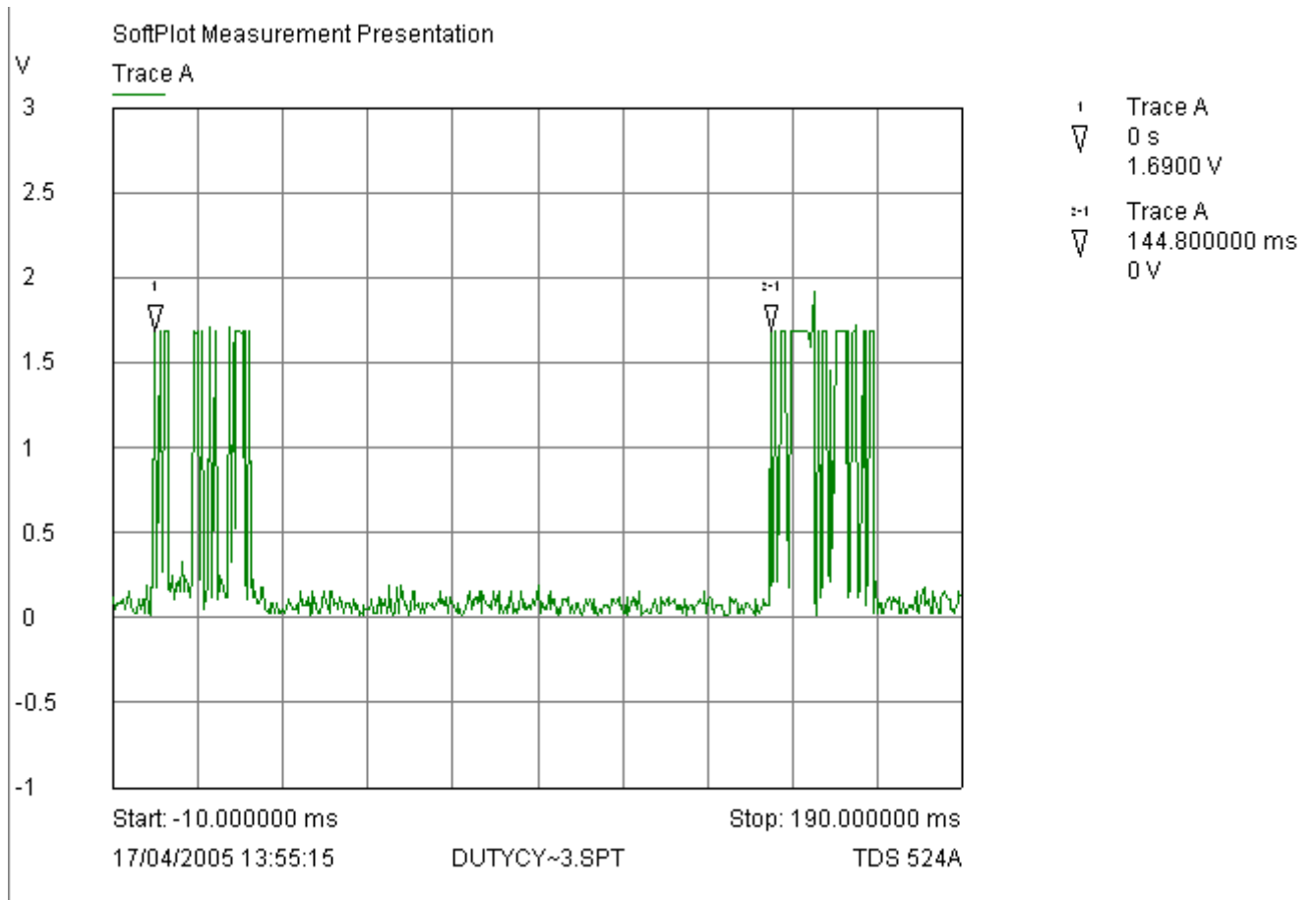


Plot 8 -15.231 Radiated Emission

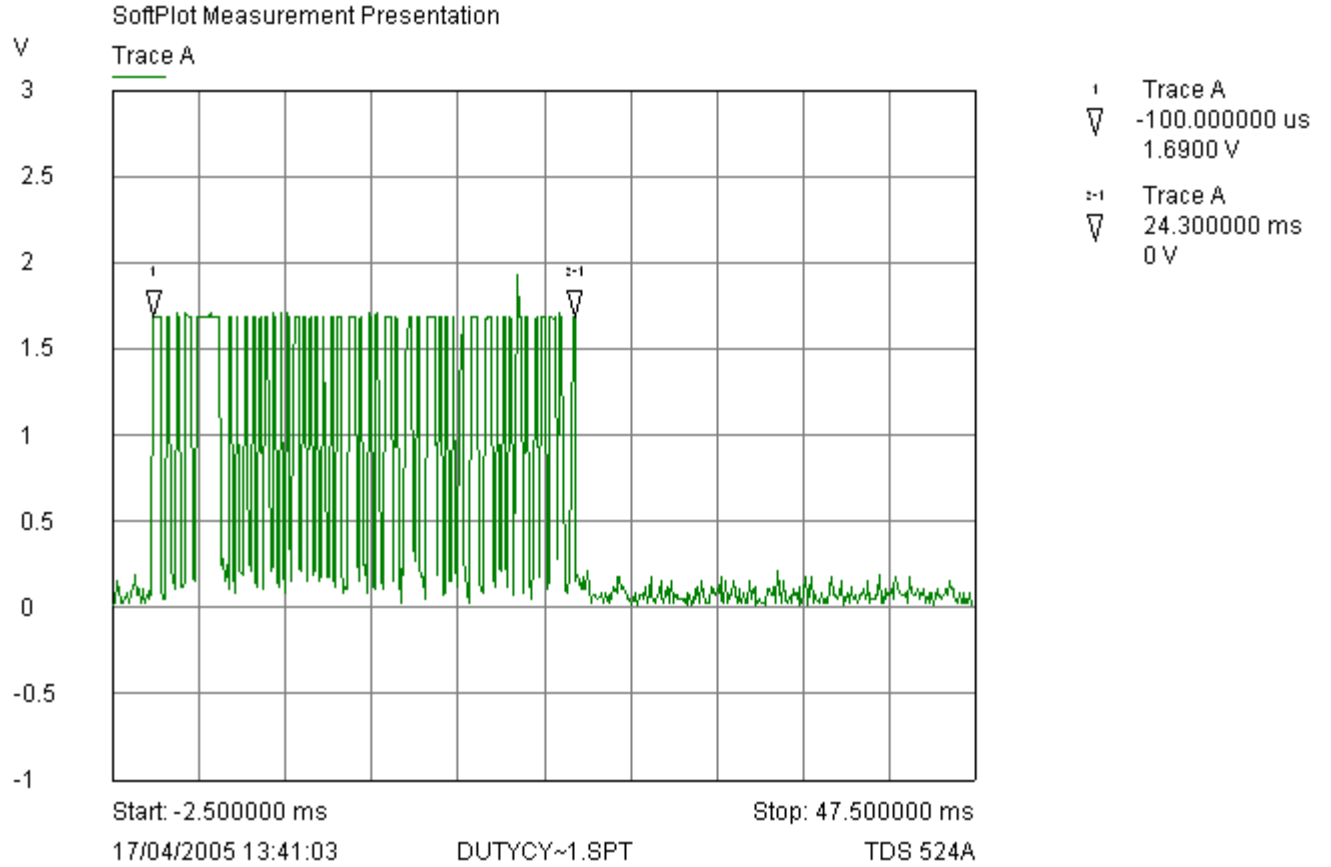
Analyzer setting: R.BW-120K, V.BW-1MHz, QP Transmitter



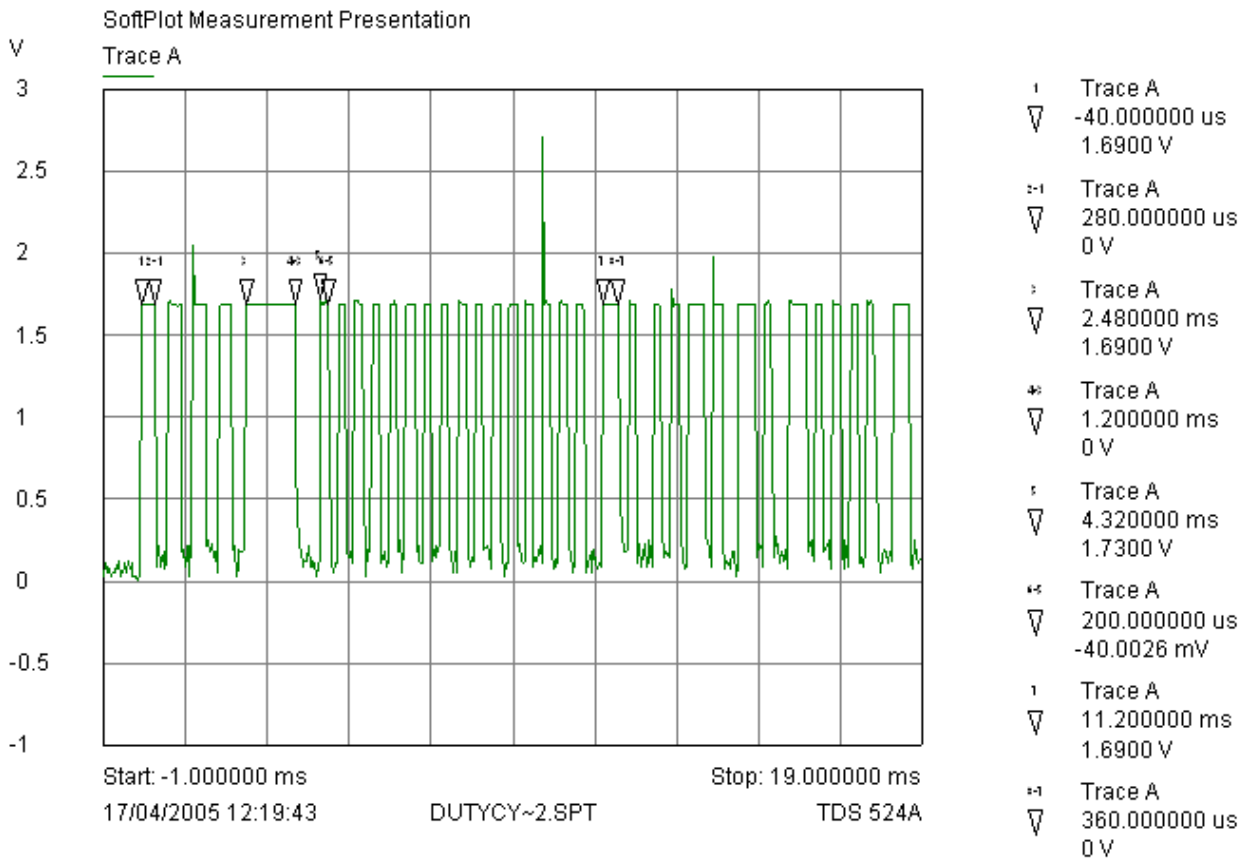
Plot 9 .109 Radiated Emission



Plot 10 Duty Cycle



Plot 11 Duty Cycle



Plot 12

Duty Cycle

$$TX/ON = 4 \times 312 \mu s + 1248 \mu s + 36 \times 208 \mu s + 5 \times 400 \mu s = 12.3 \text{ msec}$$

$$\text{Average Factor} = 20 \log(TXON/100)$$

$$20 \log 12.3/100 = -18.2$$

9 CORRECTION FACTORS

DOUBLE RIDGE HORN Model 3105 S/N:00-50C2-1C-C468 2052 Antenna Factor

Frequency (MHz)	Ant. Factor (db/m)
1000	24.4
2000	26.2
3000	30
4000	32.6
5000	33.8
6000	34.9
7000	36.2
8000	36.9
9000	37.8
10000	38.4
11000	39.1
12000	40.1
13000	42
14000	40.6
15000	39.3
16000	40.3

Antenna Factor for broadband antenna model BTA-L S/N:00-50C2-1C-C468 980045L

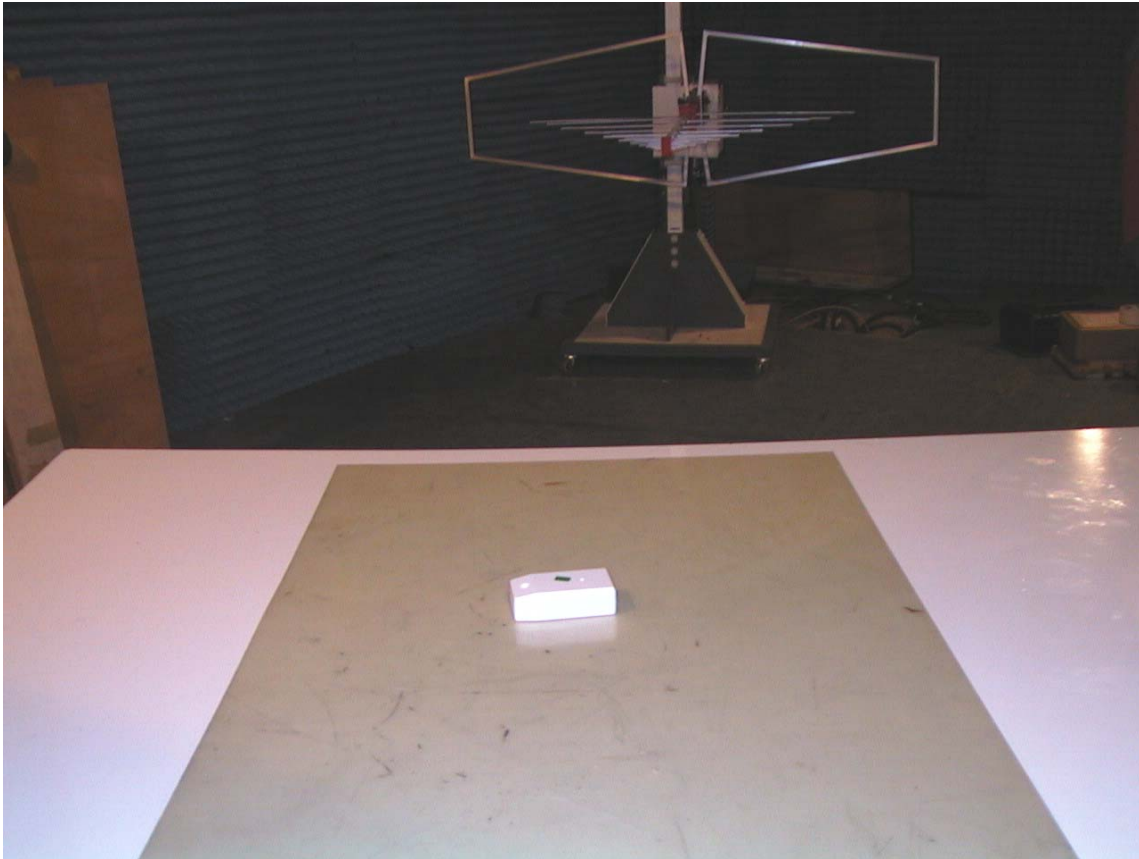
Frequency (KHz)	Ant. Factor (db/m)	Frequency (KHz)	Ant. Factor (db/m)
30	19.05	300	14.35
32	19.13	310	14.28
34	18.74	320	14.43
36	18.03	330	14.13
38	16.61	340	14.48
40	15.44	350	14.89
45	13.66	360	15.12
50	11.52	370	15.70
55	10.04	380	15.78
60	7.68	390	16.22
65	6.11	400	16,45
70	5.47	425	16.99
75	5.98	450	17.59
80	6.86	475	17.28
85	7.20	500	17.69
90	7.47	525	18.91
95	7.23	550	19.06
100	7.20	575	18.20
105	7.30	600	18.87
110	7.37	625	18.81
115	7.02	650	19.64
120	6.82	675	19.92
125	7.05	700	20.66
130	7.83	725	21.08
135	9.61	750	21.53
140	7.93	775	22.39
145	8.03	800	22.66
150	8.29	825	22.87
160	8.72	850	22.65
170	9.18	875	23.12
180	9.05	900	23.70
190	9.80	925	23.40
200	10.61	950	23.43
210	10.34	975	23.30
220	11.21	1000	24.02
230	11.69		
240	11.62		
250	11.85		
260	12.45		
270	13.16		
280	13.48		
290	13.74		

10 Abbreviations and Acronyms

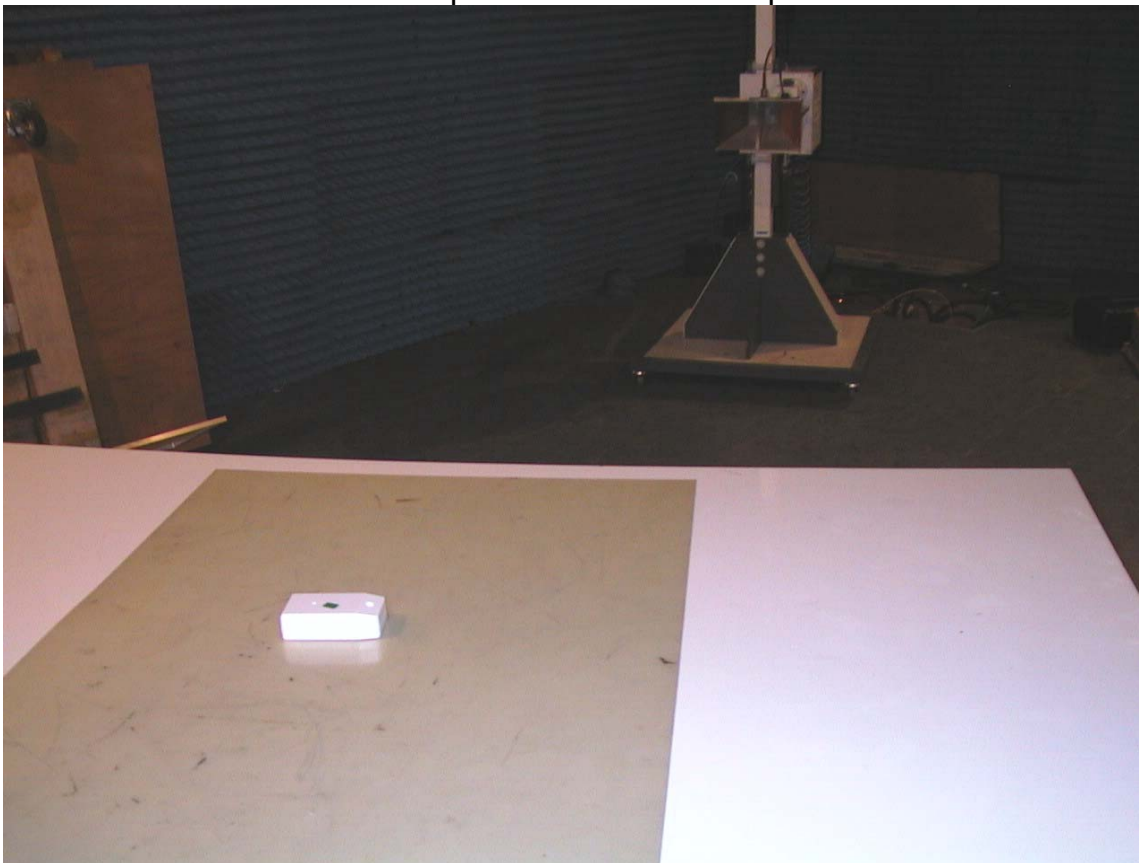
The following abbreviations and acronyms are applicable in this document

BW	Bandwidth
R.BW	Resolution Bandwidth
V.BW	Video Bandwidth
db	Decibel
EMI	Electromagnetic interference
E.U.T	Equipment under test
LISN	Line impedance stabilization network
S/N	Serial number
QP	Quasi peak
PK	peak

11 PHOTOGRAPHS



Picture-1 Spurious Emission set up 30-1000MHz



Picture-1 Spurious Emission set up 1-18GHz



Picture-3 E.U.T



Picture-4 E.U.T